Livestock

Coordinators

J.-F. Tourrand
P. D. Waquil
M.-C. Maraval
M. T. Sraïri
L. G. Duarte
G. V. Kozloski

CIRAD - French Agricultural Research Center for International Development

Livestock systems in the midst of History's upheavals in Kazakhstan

Gaukhar Konuspayeva[1] and Bernard Faye[2]

INTRODUCTION

The place of livestock in Kazakhstan, both historically and geographically, is central in the country's culture and economy, even if the industrial revolution during the 20th century, enabled by the political changes that occurred at the same time, have decreased its importance. With an area of 2.7 million square kilometers (9th place in the world), mainly composed of arid or semiarid regions, steppes or desert (more than 80% of the territory), Kazakhstan's location in the heart of Central Asia is the hub of the regional economy (Figure 1). However, with only 18 million inhabitants, the country is characterized by a low human density, and only crop and livestock activities can contribute to the occupation of the spaces, especially since farming remains mainly extensive.

Figure 1: Location of Kazakhstan in the heart of Central Asia

Whereas cattle farming occupies the most favorable areas, the steppe regions are dominated by horse (the Kazakh population consumes a lot of horse meat and mare

[1] Al Farabi Kazakh National University, Almaty, Kazakhstan; konuspayevags@hotmail.fr
[2] CIRAD, UMR SELMET, F-34398 Montpellier, France
SELMET, Univ Montpellier, CIRAD, INRAE, Institut Agro, Montpellier, France; bernard.faye@cirad.fr

milk) and sheep farming, and, at least in the Southern parts and in the most marginal areas (desert), by camel farming. The country is indeed marked by large, nearly empty spaces, often semiarid, which only these species adapted to such a context are able to value.

This chapter focuses on livestock farming, which has undergone a century of intense upheavals that have induced deep changes in production systems, irreversibly altering farming patterns and more generally the rural life and agricultural economy. The modernization of the rural life displayed as a primary objective by the authorities in place today cannot be envisioned without understanding the weight of the upheavals that marked the 20th century.

KAZAKHSTAN, AN AREA HISTORICALLY DEVOTED TO NOMADIC PASTORALISM?

Immense spaces

Formerly populated by nomadic riders, more than 33% of the territory consists of steppes, and 53% of deserts and semideserts (Figure 2). The central part is a sandy plateau with small hills surrounded to the north and northeast by the Sary-Arka plains, to the south by the Touran plain, to the west by the Caspian plain. In the east and southeast, several mountain chains (Altay, Djungar Alatau) alternate with depressions (lakes of Zaisan, Balkhash, valleys of Alaköl, Ili and Chu, Talas). The central part between Karaganda and Shymkent is a sandy desert (Moyoumkum). The highest point (Khan-Tengri) in the Alatau chain reaches 6995 meters (or 7010 m according to some data) above sea level.

The steppe zones therefore represent the main feed resource for the herd. These pastures are in four geographical areas with different ecological characteristics: i) a flat area, a broad strip along the territory in Northern Kazakhstan, characterized by a vegetation based on *Stipa* spp*., Festuca* spp*.* and wild oats (*Avena* spp.), ii) a semidesert zone, consisting of a strip crossing Central Kazakhstan, typical with its scrubs and wormwood (*Artemisia* spp.) pastures, iii) the desert extending from the south to the west, sand deserts with woody vegetation based on 'saxaul' (*Haloxylon* spp.), sometimes mixed with tamaris (*Tamarix* spp.) and wormwood (*Artemisia* spp.), and iv) Southern pastures interspersed with desert basins, which can be used all year round.

History dominated by nomadism

Historically, according to the earliest available data on the Kazakhs and living peoples in the current territory of Kazakhstan (Mesolithic and Neolithic), the entire population, organized in tribes and around a family nucleus, was nomadic. The administration was based on tribal rules. Based on nomadic lifestyle, four animal species

were traditionally bred: sheep, horse, cattle and camel. The wealth of families and tribes was expressed in the number of livestock head. The tribal social organization was under the traditional authority of the Bai based on family or clan connections. The crop-livestock association, a prerogative of the oasis culture, was scarcely present in neighboring countries (territories of the Uzbeks and Turkmens), because the territory of the Kazakhs, almost without large oasis cities such as Samarkand, Bukhara or Merv, indispensable steps along the Silk Road, offered only large spaces and more modest oases which undoubtedly have less marked the history of the region (Taraz, Samara and to a lesser extent Yasi, the current Turkestan). Consequently, with a very modest urban culture, the Kazakh population was in permanent mobility on a vast territory.

Figure 2: Kazakhstan. Source: www.kazakhstanlive.com

In the 19th century, nomadism and transhumance remained the main if not the sole rearing type. Pastures, steppe or desert, constituted the only feeding resource for livestock, as supplementation was not practiced. Three types of mobility were described: i) a completely nomadic system, ii) a seminomadic system comprising a permanent wintering point, and iii) an alpine transhumant system which mainly concerned horses and sheep (Kerven et al., 2009). About 80% of families traveled at least twice a year over distances ranging from 300 to 1000 kilometers on a north-south axis, except for families with alpine transhumance on shorter distances (30–35 kilometers). By the end of the 19th century under pressure from the Russian

administration, the beginning of sedentary activities was launched by attributing the best pastures to Russian settlers, forcing part of Kazakh nomads to become farmers (Olcott, 1981).

It was at this time that some of the livestock, dominated by sheep and horses in the steppe area, and by camels in the desert area, yielded a growing place to cattle. These were less adapted to the long-distance movements dictated by the constraints of the environment and the free pasture in winter, and they remained a minority. However, with the arrival of the Russian settlers, forage crops for cattle feeding were introduced in the North to meet the meat demand of the powerful neighbor. Nevertheless, before the Bolshevik revolution, nearly 70% people were still nomads across the territory.

Livestock farming: A considerable potential

With about 180 million hectares of steppes and mountainous territories, Kazakhstan ranks sixth in pastoral resources (after Australia, the Russian Federation, China, the USA, and Canada) and first place in pasture area per head of cattle. About only 10% of these lands are cultivated, and the rural population (which today represents 5.2 million inhabitants) mainly depends on traditional livestock farming. More than 29% of the population still lives in rural areas. The part of agriculture still reached 4.9% of the gross domestic product in 2014 (compared with 34% in 1990) – the country has experienced at the same time a sharp increase in the mining and oil sector, which has reduced the relative share of agriculture despite the agricultural development program.

Although agriculture has known a boom in recent decades (wheat, rice, cotton, sugar beet, rapeseed, sunflower, barley and forage crops), animal resources remain important both for drafting and production (Table 1). Moreover, the evolution of prices since independence differs according to the type of production but the trend is to a price increase of animal products, much consumed by the Kazakhs.

Table 1: Production according to the livestock species in Kazakhstan in 2014

	N	Meat (ton)	Milk (ton)
Cattle	6,032,742	766,976	5,020,353
Sheep	15,535,302	285,834	0
Goat	2,379,266	42,868	1,785
Horse	1,937,921	178,442	25,094
Camel	165,888	11,999	13,180
Pig	884,738	143,273	–
Deer (maral)		13,5	–
Poultry	35,020,019	172,815	–
Other animals		238	–
Total production		1,602,458	4,060,413

Source: Ministerial Committee of Economic Statistics, Kazakhstan, 2014

It should also be noted that farm species in Kazakhstan are marked by a large biodiversity whose preservation is an issue for the future. For example, the cattle population is represented by eight local or regional breeds (Kazakh White-Headed, Latvian Brown, Black-Magpie, Steppe Red, Alataou, Aouliyekol, Gallovei, Aoulieata) and four exogenous breeds. There are also many breeds of small ruminants, including the famous Karakul sheep bred for its fleece. Horses, bred for their meat and milk, are represented by a dozen breeds as well. The camel population is characterized by the cohabitation of two species, the Bactrian of the Kazakh Bactrian breed, with its three types (Oralbokeïlik, Kyzylorda, and Ongtüstik Kazakhstan) and the Arvana breed (dromedary camel) to which it is necessary to add many hybrids (Faye and Konuspayeva, 2012).

UPHEAVAL OF THE BOLSHEVIK REVOLUTION

The beginnings of the Bolshevik revolution appeared rather beneficial to the breeders who recovered part of the land occupied by Russian settlers. Support from the new State even allowed them to develop small agricultural enterprises.

Stalin's ideology

According to Stalin's ideology, the nomadic way of life was not compatible with the modernization of the rural economy in a socialist society. Farming based on the mobility of herds and men, and its tribal organization had to be destroyed to the root. This was done in three phases, all of which had a significant impact on the organization of the traditional rural society. The first phase consisted of the 'dekulakization' of the society, in other words, destroying the traditional authority of the Bai, all assimilated to wealthy farmers ('Kulak'), although their status in terms of animal capital could be very contrasted. The policy of dekulakization resulted in the arrest and deportation of most of the Bai, at least those who had not migrated to neighboring countries (China, Afghanistan). In fact, the liquidation of the Kulaks (which largely exceeded the Bai group alone) was both physical and institutional.

In a second phase, the Soviet power of this time carried out the forced settlement of the whole population, banning, in a first step (despite common sense), any seasonal movement of the herds, even if the authorities reversed this decision in the face of the constraints of the environment. In the last phase, the power set up the collectivization of production systems, which was carried out under conditions of extreme violence as those in the previous phases (Ohayon, 2006). The 1927–1932 events led not only to the death of nearly one third of the Kazakh population and to the entire destruction of the previous space organization, but also to a dramatic decrease in the number of animals, especially those reared by nomads, i.e. sheep, horses and camels. In a population mainly consuming animal products, this led inexorably to a famine heightened by the effects of collectivization. More than 1.3 million people, mainly from the steppe zones, perished during these dark years.

Under such conditions, the sheep population fell from 18 million to 12 million head, and the horse population from 3.5 million to only 800,000. Camels lost 90% of their population, from 1.2 million in 1927 to 120,000 head only on the eve of World War II. Regarded as an animal of the past, unlike the cow seen as the animal of the socialist modernity, the camel, hindered in its permanent quest for mobility, suffered more than the other animals the consequences of the forced settlement of the breeders. The disastrous effects of this proactive policy have been felt throughout the Soviet period, even if adjustments were made as early as the 1930s and heightened after the war (easing on mobility, regeneration of the pastures, food security during winter).

At the same time, however, Soviet agronomic research grew considerably in a myriad of institutes and universities, enabling the promotion of scientific development of crops and livestock. However, the Soviet agronomists and animal scientists developed a very top-down approach, with science being responsible for applying the recipes concocted in laboratories. Such an approach was facilitated by the status of agriculture, now directly or indirectly in the hands of the state, supposed to promote "the collective ownership of the means of production", and which was in fact only a form of administrative management of agricultural and livestock enterprises. These took two forms, the sovkhoz (or State farm) where the peasants were all salaried, the Soviet power having in view the proletarization of the peasant world, and the kolkhoz (peasant cooperative), in which members were interested directly to the results of the enterprise and could benefit from a private plot of 4000 square meters for family needs.

These collective structures (which were initially based on volunteerism) were like the modernization of the traditional Russian Mir. The new structures, by bringing together many of the tiny farms of the prerevolution, allowed for economies of scale that were supposed to make agricultural production more efficient. The result, in the end, was in fact contrasted, the inefficiency of the Soviet system being able to coexist with real advances in agricultural productivity (Grigg, 1985). On the other hand, the collectivization in traditional Kazakh structures, based on mobility and tribal management of pastoral spaces, has durably affected the productivity of livestock. The establishment of collective structures has also had two important consequences on the organization of work: i) the specialization of the professions of agriculture, consequence of a kind of taylorization of activities (tractor driver, milker, reaper rather than 'peasant'), and ii) a direction (kolkhozes) or an administration (sovkhoze) that was more a response to a demand from above (the five-year plan) than an answer to the needs of the population.

Agricultural grasp of pastoral lands and degradation of rangelands

Beyond, and despite the plummet in the number of livestock, the collectivization policy has also led to a degradation of pastoral resources. It had already started in Kazakhstan with the post-revolution sedentary phase, but it worsened in the period

1960–1980 because of i) the conversion of pastures into crop land, particularly under the influence of the ambitious Valorization of Virgin Land program, launched by N. Khrushchev in 1953, to transform Kazakhstan into a wheat granary of the Soviet Union, and ii) overgrazing related to the constraints imposed on herd movements. This deterioration was exacerbated by the drop in groundwater levels near rivers and streams, especially around the Aral Sea, whose supply waters declined because of the large-scale irrigation of cotton fields from the Syr-Darya River. A large part of the land was changed into desert and/or was salinized, making it unsuitable for pastoralism.

The changes in cycles and the magnitude of traditional mobility, the main guarantee of spatially balanced management, have led to a gradual fragmentation of the pastoral space (Kerven et al., 2006), concentrating livestock in certain areas (e.g. around water points) and thus increasing the pressure on pastoral resources that have become less available and less abundant than in the past. On the eve of independence, the Kazakh pastoral space was thus not only deteriorated (Schillhorn van Veen, 1995), but it was also affected by pollution of industrial or agricultural origin (Konuspayeva et al., 2011a). This situation had direct or indirect consequences on livestock and their productions (Kenesariyev et al., 2008a; Konuspayeva et al., 2011b), and on consumers (Kenesariyev et al., 2008b).

UPHEAVAL OF INDEPENDENCE

The independence of the Republic of Kazakhstan following the Soviet Union collapse in 1991 deeply altered, once again, the agricultural landscape of the country and the livestock sector. Three factors have played a major role in the restructuring of the sector: privatization, atomization of large structures, and the emergence of large agricultural enterprises in the process of modernization.

Collective structures dismantling

The privatization process began timidly shortly before independence, during the restructuring period (perestroika) initiated by M. Gorbachev. The land, animals and equipment belonging to collective structures were allocated to members of cooperatives to begin a gradual transition toward privatization (Vidon, 1998). The process accelerated after independence and took place in three phases: i) the Land Reform of 1991 which defined the duration of the leases accessible to private farmers (the land in fact continued to belong to the State), ii) the recognition, early 1993, of the rights of individuals to establish private farms, and iii) the inclusion of collective structures (sovkhozes and kolkhozes) in the privatization process in 1994–1995. The main part of privatization took place in the last two years. Privatization was not only about land, but also about production assets and animals.

In practice, the redistribution of the means of production was very unequal and sometimes was a real looting of all old collective structures, including collective

cultural or educational buildings, as cooperatives and state farms were integrated systems that included schools, dispensaries and culture houses.

The privatization of livestock suffered the same fate as the rest of the assets, but the State's part remained important for a long time. There were also strong regional differences, with smaller structures being more present in the South than larger ones. In 1994, 33% of the sheep still belonged to collective structures where the State's part prevailed.

Animal production decline

However, the main impact of privatization on livestock was the drastic decrease in numbers, which recalled the effects of the forced collectivization of the 1930s. The numbers had increased steadily after World War II (around 5% per year), but had generally stagnated or even declined since the 1980s because of poor livestock feeding, unequal management of production units and misrepresentation related to directed planning (Kerven et al., 2009). This stagnation phenomenon observed in the 1980s thus increased until independence, although the fall in numbers is difficult to assess because the available statistics of this period are subject to caution: probably overvalued to satisfy the demands of the plan in the 1980s, the numbers were under-reported after independence to avoid the payment of the tax introduced on private animals.

Nevertheless, the fall truly occurred because the breeders had to reduce their herds in order to face the cost of inputs now borne by them. Moreover, from a monoactive specialist, as reported above, the breeder was supposed to carry out the multiple activities of a peasant without having the skills, which led to management errors with sometimes disastrous consequences on the health or feeding management with an increase in livestock mortality (Delehanty and Rasmussen, 1995). The lack of cash also resulted in a drastic reduction in sheep number, which became a currency for exchange. The sheep population dropped from 33 million head in 1991 to 13 million in 1996. The same phenomenon was observed in all the former Soviet Central Asian republics (Vidon, 1998). The cattle herd was equally affected by the decrease in numbers, from 9 million head in 1991 to less than 5 million in 1997 (table 2).

Table 2: Changes in the number of livestock since the independence of Kazakhstan

	1992	1997	2008	2014
Cattle	9,084,000	5,424,600	5,840,900	6,032,742
Sheep	33,908,000	13,000,000	13,470,100	15,535,302
Goat	692,000	679,000	2,609,900	2,379,266
Horse	1,666,400	1,310,000	1,291,100	1,937,921
Camel	145,100	111,100	143,200	165,888
Pig	2,976,000	1,036,400	1,352,700	884,738
Poultry	59,300,000	15,296,000	29,400,000	35,020,000

Source: FAOStat

In 2014, only camels and horses had exceeded their numbers at the time of independence. The other species regained only partially their numbers. Even the swine population, particularly affected by the massive emigration of the Russian, Ukrainian and German populations in the days after the independence (the mostly Muslim Kazakh population does not traditionally consume pigs), kept decreasing. Overall, the numbers dropped between 1992 and 1997-1998 by 53% (cattle), 60% (small ruminants), 46% (horses), 44% (camels), 70% (pigs) and 75% (poultry) (Figure 3). This drop in numbers has also resulted in a drop in production, which decreased by more than 50% for beef, 36% for mutton, and from 5.5 million tons in 1992 to 3.3 million tons in 1997 for milk. The production also experienced its lowest level since independence in 2001. This fall could be attributed not only to declining livestock numbers by simple mechanical effect, but also to decreasing productivity, particularly in the meat sector: the average weight of bovine carcasses dropped from 185 kg in 1992 to 150 kg in 1997. At the same time, a decrease in the demand was observed with a fall of 14% in meat consumption, 12% in milk, and 16% in eggs (Vidon, 1998).

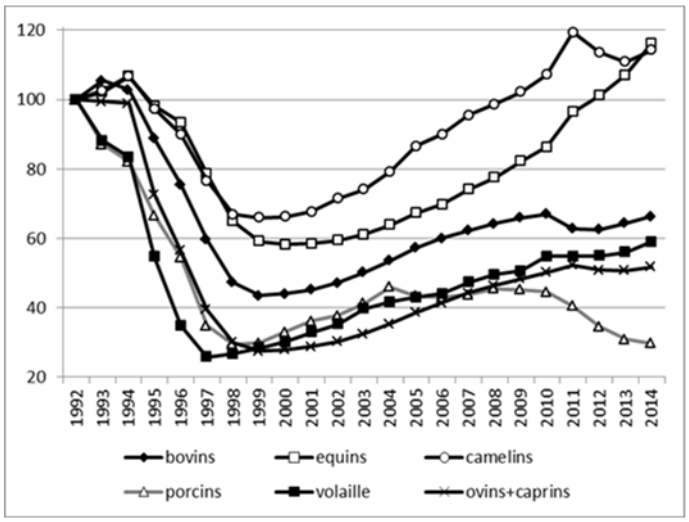

Figure 3: Changes in animal numbers in Kazakhstan since independence; Index 100 in 1992. Source: FAOStat

CHANGES IN THE FARMING SYSTEMS

The main changes observed are in the size of the farms. Between 1990 and 2012, the number of agricultural production structures increased from 5000 to 188,616, attesting to the atomization of previous collective structures (OECD, 2013). The changes in livestock systems can be summed up in three major types: i) large agricultural enterprises more or less directly derived from the collective structures of the Soviet era, ii) large farms with varying statuses, more or less specialized, resulting from the concentration of bankrupt family farms, and iii) small family structures. There is a strong regional disparity as larger structures are more present in Northern and Northeastern regions, mainly cultivating cereals, whereas smaller

structures are usually present in Southern and Western regions and more oriented toward multiple crops.

Direct heirs of large collective structures

After a dismantling phase of the sovkhozes and kolkhozes, the former presidents managed to maintain an entrepreneurial structure, either by purchasing at low prices the units of insufficiently competent members, unable to survive with the means of their production, or by integrating the former members into a kind of private cooperative. In the first case, the concentrated power evolved into a latifundium system, where the former members of the structure were reduced to becoming low-paid employees, with the owner sometimes absent. The structure has taken over the old assets and activities with a minimum of investment. In the second case, by involving all the members of the cooperative in the results of the company, the manager is committed to the modernization of the activities, looking for ways to invest in both tools and persons. These agricultural enterprises are often non-specialized (farming of different species, crops, sometimes processing). These structures include only a small proportion of cattle (7.6%), small ruminants are represented even in fewer numbers (4.3%). On the other hand, they rather specialize in pig production (almost 30% of them), and especially in poultry production (about two-thirds of the structures) (table 3). They manage large agricultural areas of more than 8000 hectares on average.

Tableau 3: Distribution (%) of farm species in the agricultural structures in Kazakhstan

	Agricultural enterprises	Large farm	Smallholder
Cattle	7.6	27.5	64.9
Sheep/goat	4.3	34.9	60.8
Pig	29.6	11.5	58.9
Horse	6.1	40.2	53.7
Camel	9.4	35.7	54.9
Poultry	65.2	1.3	33.6

Source: Ministerial Committee of Economic Statistics, Kazakhstan, 2014

Large farms: Result of the concentration

The large farms were formed by the aggregation of more specialized family farms that abandoned their activities by lack of adaptation to privatization and by a gradual investment to strengthen the means of production. They formed gradually with the lead of an investor-breeder in search of modernity, ready to invest the market by focusing on both production and processing. The diversification of activities occurred in a second step to bring an added value to the products. In the livestock sector, a good third of small ruminants and camels, a little more than that of horses, and slightly less of cattle have been present in these farms. On the other hand,

these farms have been less present in the pig sector (11.5%) and especially in poultry farming (1.3% only) (table 3).

Family farming, late for investment and modernization

Small family farms hold most of the livestock population (except for poultry), as more than half of the Kazakhstan's animal population is included in this type of structure (table 3). Family farms produce more than 80% of milk and 67% of meat (all species combined). They therefore play a key role in the supply of animal protein to the population, but also in food security for the rural population, the part of self-consumption being very important. They are part of often unstructured and very short commodity channels (direct sales to consumers or bazaars) and offer highly variable quality products. The meat productivity per animal appears significantly lower than in large structures: the average live weight at slaughter is 315 kg in family farms, 325 kg in large farms, and 399 kg in agricultural enterprises. The average dairy productivity of cows is higher in family farms than in large farms (2320 L *vs*. 1767 L), but it is much lower than in large agricultural enterprises (4252 L) which generally benefit from better genetics and feeding.

MODERNIZATION: A MAJOR ISSUE IN KAZAKHSTAN AGRICULTURE

Within two decades, the structure of farms has thus been completely reversed from the absolute domination of large structures to the predominance of family farms, often at the limit of subsistence. This drastic change in operating structures raises the issue of the modernization of agriculture.

Concerned about the challenges faced by agriculture, the State decreed for years 2003–2005 its support by investing 600 billion tenge (KZT, i.e. 4.6 billion USD at that time) in the sector. Since then, a sustainable development program for 2005–2010 has been decided (Act No. 184-185 of 12 July 2005); Agriculture is part of the government's priorities under its 2030 strategy program to exit particularly from 'all oil' and diversify export activities. In the years that followed, state aid to agriculture averaged 200 billion KZT (1.36 billion USD) per year. This amount represents an average of 11% of farmers' gross revenues, which is ultimately modest compared to farmers' support from OECD countries, averaging 21% (OECD, 2013). However, 82% of these public subsidies concern measures related to production and prices. Producers are therefore disconnected from the markets and their production decisions may be misrepresented (OECD, 2013).

Elsewhere, this support appears unequal. Family farming, although now predominant, is not being the most subsidized and appears rather cut off from technical innovation. To pursue modernization of agriculture, it is essential to invest public funds in agronomic research and training of all the stakeholders in the sector, and in technical innovation, transport infrastructure and protection systems. Producers

are often isolated in this huge, sparsely populated country. They have to face the remoteness of consumption centers that increase transaction costs and hinder the development of agriculture. Hence the priority has to be given to the building of rural roads. This situation mainly affects the meat and dairy sectors, as the lack of modern refrigerated storage and transport means often prevents sales beyond the local market.

CONCLUSION

After the main political and sociological events related to the Soviet revolution in years 1927–1932 and independence in 1991, the livestock farming in Kazakhstan has undergone significant changes marked by a dramatic decline in animal numbers and production, followed by a slight recovery accompanying the restructuring of the production systems. However, the interest of the Kazakh population in animal production is an asset to support livestock in this country. The modernization of this activity is a major issue for the next decades because the country has considerable potential.

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